Statement of Verification

BREG EN EPD No.: 000243 Issue 1

This is to verify that the

Environmental Product Declaration

provided by:

Hanson UK

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

BRE Global Scheme Document SD207

This declaration is for:

Hanson General purpose CEM II

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Hanson
HEIDELBERGCEMENT Group

Signed for BRE Global Ltd	Laura Critien Operator	30 May 2019 Date of this Issue
30 May 2019 Date of First Issue		29 May 2024 Expiry Date

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Environmental Product Declaration

EPD Number: 000243

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013
Commissioner of LCA study	**LCA consultant/Tool**
Hanson UK Maidenhead 14 Castle Hill Maidenhead Berkshire SL6 4JJ United Kingdom	BRE LINA v 2.0.8
Declared/Functional Unit	**Applicability/Coverage**
1 Tonne of cement	Product Average.
EPD Type	**Background database**
Cradle to Gate	ecoinvent

Demonstration of Verification
CEN standard EN 15804 serves as the core PCR [a]
Independent verification of the declaration and data according to EN ISO 14025:2010 ☐Internal ☒ External
(Where appropriate [b])Third party verifier: Nigel Jones
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A1:2013. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A1:2013 for further guidance

Information modules covered

Product			Construction		Use stage							End-of-life					Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building							
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal		Reuse, Recovery and/or Recycling potential
☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

Hanson General purpose CEM II results represented in this EPD are the weighted average results based on production data from the three Hanson sites below:

Ketton Works Ketton Stamford Lincolnshire PE9 3SX	Ribblesdale Works West Bradford Road Clitheroe Lancashire BB7 4QF
Padeswood Works Mold Flintshire CH7 4HB	

Construction Product:

Product Description

General Purpose cement is an BS EN197 CEM II cement is made from cement clinker, gypsum, both natural and synthetic, and up to 20% limestone. Principally for general purpose use in concrete, mortar, render and screed for non structural applications. General purpose is sold in 25kg paper sacks

Technical Information

Property	Value, Unit
Compressive strength classes	42.5N and 32.5R MPa (N/mm^2)
Dry bulk density	1400-1600 kg/m^3

Main Product Contents

The weighted average composition of the General Purpose CEM II, calculated based on production output and the composition at each of the three production sites, is shown below:

Material/Chemical Input	%
Clinker	78.1
Limestone	17.2
Gypsum	4.5
Ferrous Sulphate	0.2

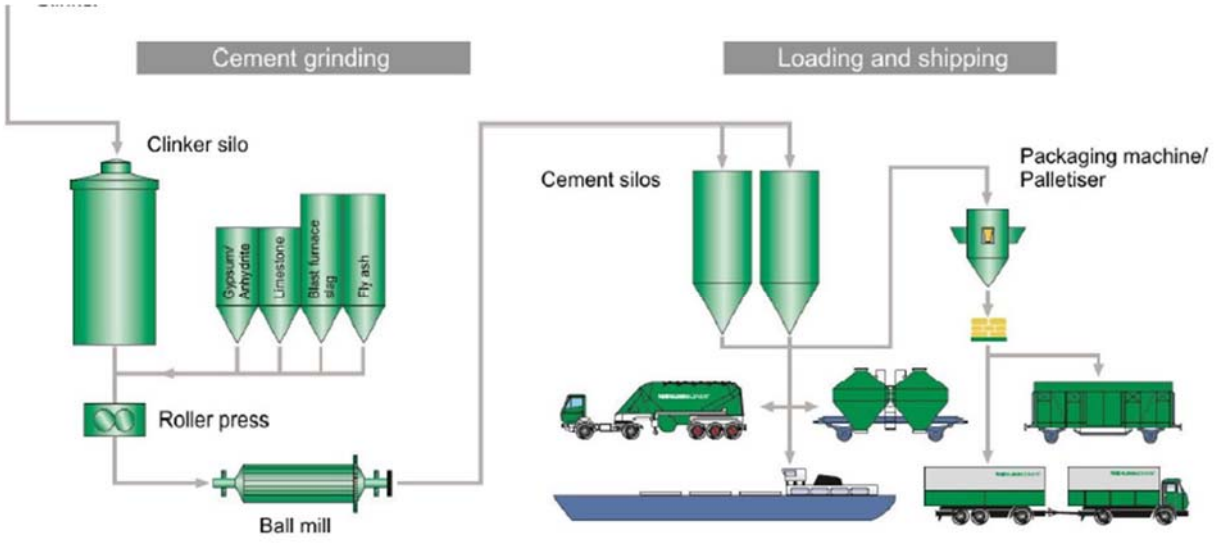
Manufacturing Process

Cement is produced by grinding cement clinker produced on site with gypsum and limestone to a fine powder in grinding mills.

The unground clinker, gypsum, limestone are weighed out from their respective silos in the required proportions for the particular type of cement. These materials are fed into the ball mill and ground to a fine powder the product from the mill is conveyed to a dynamic separator which is used to control the fineness of the cement product. When used, grinding aid is added to the raw materials as they enter the mill to improve the efficiency of the separator and prevent unnecessary grinding of cement that has already been ground to the desired particle size. The cement product is collected in a bag filter and the transported to storage silos before being loaded as bulk cement. Internal cooling water sprayed into the cement mill and evaporated to maintain a stable operating temperature and prevent dehydration of the gypsum which can lead to quality problems. Where required a small amount of ferrous sulphate is added to the cement before it is conveyed to the silos. This is to ensure any hexavalent chromium present in the cement is reduced to less than 2ppm as required by legislation.

Cement for the bagged market is packed in either paper or plastic sacks which are palletised and shrink wrapped before dispatch to customers. General purpose cement is only packed in paper sacks.

Process flow diagram



Life Cycle Assessment Calculation Rules

Declared / Functional unit description

1 Tonne of packed General Purpose CEM II

System boundary

The system boundary of the LCA is according to the modular approach as defined in EN 15804+A1. This cradle-to-gate EPD includes the product life cycle stages of A1 to A3.

Data sources, quality and allocation

This LCA study was carried out using BRE LINA. The tool has been pre-verified to confirm to the modelling requirements of EN 15804+A1. Manufacturer specific data for three individual Hanson UK manufacturing sites for the period of the 12 months of 2017 was modelled to create a weighted average results dataset that represents General purpose CEM II made across the three sites.

Secondary data for upstream and downstream processes are as provided in the BRE LINA tool. The background LCI datasets are based on ecoinvent database v3.2. The Hanson UK cement clinker dataset used had been previously created in BRE LINA using Hanson specific data and already accounts for most of the impacts associated with the General Purpose CEM II manufacture.

The input to the process is from the on site clinker store and limestone
from the quarry. The delivery to site of other raw materials and packaging materials and their associated impacts is included in the scope. Raw materials quantities per tonne have been based on the proportions of each, as used at each site obtained from production records. As clinker and limestone are respectively made and extracted onsite, transport of these materials has not been included, except for the Padeswood where limestone is extracted 12 km away. All site energy consumption with the exception of that consumed in the cement milling, cement conveying and packing has been included in the LCA to create the clinker datasets, so are not added here to avoid double counting. The energy consumption for cement production is calculated based on sub meter information for each of the production sites. Similarly water consumption and waste generation has all been allocated to the clinker manufacturing process. The emissions to water have been considered in the clinker data set and are omitted here to avoid double counting.

Cut-off criteria

No inputs or outputs have been excluded. All raw materials, including the delivery of raw materials and packaging to site, the delivery and use of fuel to plant including the fuel used by the mobile plant, the water used and waste produced are included. Calculated emission to air and water related to the production process are calculated from continuous emissions monitors or using technical estimations.

LCA Results

The results below show the weighted average (based on production tonnage) of the General Purpose CEM II results across the three sites, per tonne.

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			GWP	ODP	AP	EP	POCP	ADPE	ADPF
			kg CO_2 equiv.	kg CFC 11 equiv.	kg SO_2 equiv.	kg $(PO_4)^{3-}$ equiv.	kg C_2H_4 equiv.	kg Sb equiv.	MJ, net calorific value.
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	7.61E+02	9.49E-06	1.32E+00	4.61E-01	1.28E-01	2.18E-04	3.46E+03
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND	MND	MND	MND
	Transport	C2	MND	MND	MND	MND	MND	MND	MND
	Waste processing	C3	MND	MND	MND	MND	MND	MND	MND
	Disposal	C4	MND	MND	MND	MND	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND	MND	MND	MND

GWP = Global Warming Potential;
ODP = Ozone Depletion Potential;
AP = Acidification Potential for Soil and Water;
EP = Eutrophication Potential;
POCP = Formation potential of tropospheric Ozone;
ADPE = Abiotic Depletion Potential – Elements;
ADPF = Abiotic Depletion Potential – Fossil Fuels;

LCA Results (continued)

Parameters describing resource use, primary energy								
			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	6.76E+02	4.28E-04	6.76E+02	3.98E+03	0.00E+00	3.98E+03
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND	MND	MND
	Transport	C2	MND	MND	MND	MND	MND	MND
	Waste processing	C3	MND	MND	MND	MND	MND	MND
	Disposal	C4	MND	MND	MND	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND	MND	MND

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;
PERM = Use of renewable primary energy resources used as raw materials;
PERT = Total use of renewable primary energy resources;
PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;
PENRM = Use of non-renewable primary energy resources used as raw materials;
PENRT = Total use of non-renewable primary energy resource

LCA Results (continued)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	8.48E+01	0.00E+00	1.61E+03	1.18E+00
Construction process stage	Transport	A4	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND
	Transport	C2	MND	MND	MND	MND
	Waste processing	C3	MND	MND	MND	MND
	Disposal	C4	MND	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results (continued)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG
	Total (of product stage)	A1-3	4.02E+00	6.95E+00	1.05E-02
Construction process stage	Transport	A4	MND	MND	MND
	Construction	A5	MND	MND	MND
Use stage	Use	B1	MND	MND	MND
	Maintenance	B2	MND	MND	MND
	Repair	B3	MND	MND	MND
	Replacement	B4	MND	MND	MND
	Refurbishment	B5	MND	MND	MND
	Operational energy use	B6	MND	MND	MND
	Operational water use	B7	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND
	Transport	C2	MND	MND	MND
	Waste processing	C3	MND	MND	MND
	Disposal	C4	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

LCA Results (continued)

Other environmental information describing output flows – at end of life						
			CRU	MFR	MER	EE
			kg	kg	kg	MJ per energy carrier
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	1.30E+00	5.63E+00	0.00E+00	0.00E+00
Construction process stage	Transport	A4	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND
	Transport	C2	MND	MND	MND	MND
	Waste processing	C3	MND	MND	MND	MND
	Disposal	C4	MND	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

Sustainability at Hanson UK – Our vision

Our vision is to be the clear and sustainable market leader, focused on exceeding customer expectations through an engaged team that is responsible, reliable and safe.

Our approach is built around six topics which underpin our sustainability policy and performance indicators:

- **Enabling sustainable construction** – partnership and product development
- **People and communities** – zero harm in the workplace; creating sustainable communities and working with our stakeholders
- **Carbon and energy** – climate change and energy use
- **Waste and raw materials** – sustainable consumption and production
- **Water and biodiversity** – water conservation and enhancing the natural environment
- **Quality processes and systems** – management systems for continual improvement.

We have clear targets within these topics and report annually on progress and performance.

References

BSI. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products. BS EN 15804:2012+A1:2013. London, BSI, 2013.

BSI. Environmental labels and declarations – Type III Environmental declarations – Principles and procedures. BS EN ISO 14025:2010 (exactly identical to ISO 14025:2006). London, BSI, 2010.

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BSI. Cement - Composition, specifications and conformity criteria for common cements. BS EN 197-1:2011. London, BSI, 2011